Claims

What is claimed is:

1. A method for determining spectral peak information in pattern recognition, the method comprising the steps of:

determining current pattern data;

determining a current filter coefficient; and

determining spectral peak information of the current pattern data.

2. The method of claim 1, wherein the current pattern data comprises speech data.

3. The method of claim 1, further comprising the steps of:

determining new pattern data;

determining a new filter coefficient from the current filter coefficient and at least one additional term; and

determining spectral peak information of the new pattern data.

4. The method of claim 3, wherein the new pattern data comprises speech data and the current pattern data comprises speech data.

5. The method of claim 1, wherein the step of determining spectral peak information of the current pattern data further comprises the step of determining a frequency at which a spectral peak of the current pattern data occurs.

6. The method of claim 5, wherein the step of determining spectral peak information of the current pattern data further comprises the step of determining a power in a vicinity of the spectral peak.

7. The method of claim 1, further comprising the step of augmenting a current feature vector with the spectral peak information to create an augmented feature vector.

8. A system for determining spectral peak information in pattern recognition, the system comprising:

a memory that stores computer-readable code; and

a processor operatively coupled to the memory, the processor configured to implement the computer-readable code, the computer-readable code configured to:

determine current pattern data;

determine a current filter coefficient; and

determine spectral peak information of the current pattern data.

9. The system of claim 8, wherein the current pattern data comprises speech data.

10. The system of claim 8, wherein the computer-readable code, when determining spectral peak information of the current pattern data, is further configured to determine a frequency at which a spectral peak of the current pattern data occurs.

11. The system of claim 10, wherein the computer-readable code, when determining spectral peak information of the current pattern data, is further configured to determine a power in a vicinity of the spectral peak.

12. The system of claim 8, wherein the computer-readable code is further configured to augment a current feature vector with the spectral peak information to create an augmented feature vector.

13. An article of manufacture comprising:

a computer readable medium having computer readable code means embodied thereon, the computer-readable program code means comprising:

a step to determine current pattern data;

a step to determine a current filter coefficient; and

a step to determine spectral peak information of the current pattern data.

14. The article of manufacture of claim 13, wherein the current pattern data comprises speech data.

15. The article of manufacture of claim 13, wherein the computer-readable program code means, when determining spectral peak information of the current pattern data, further comprises a step to determine a frequency at which a spectral peak of the current pattern data occurs.

16. The article of manufacture of claim 15, wherein the computer-readable program code means, when determining spectral peak information of the current pattern data, further comprises a step to determine a power in a vicinity of the spectral peak.

17. The article of manufacture of claim 13, wherein the computer-readable program code means further comprises a step to augment a current feature vector with the spectral peak information to create an augmented feature vector.

18. A method for determining and using spectral peak information in pattern recognition, the method comprising the steps of:

determining pattern data;

splitting the pattern data into at least one frequency band;

determining spectral peak information of the at least one frequency band; and

augmenting a feature vector with the spectral peak information to create an augmented feature vector.

19. The method of claim 18, wherein:

the step of splitting the pattern data into at least one frequency band comprises the step of splitting the pattern data into a plurality of frequency bands;

the step of determining spectral peak information of the at least one frequency band comprises the step of determining spectral peak information for each of the plurality of frequency bands; and

the step of augmenting a feature vector with the spectral peak information to create an augmented feature vector comprises the step of augmenting a feature vector with the spectral peak information of each of the plurality of frequency bands to create an augmented feature vector.

20. The method of claim 18, wherein the step of determining spectral peak information of the at least one frequency band comprises determining a spectral peak frequency at which a spectral peak occurs in the at least one frequency band.

21. The method of claim 20, wherein the step of determining spectral peak information of the at least one frequency band comprises determining a power of a bandpass signal centered at the spectral peak frequency.

22. The method of claim 18, wherein:

the step of determining spectral peak information of the at least one frequency band further comprises the step of determining a filter coefficient; and

the method further comprises the steps of:

determining new pattern data;

splitting the new pattern data into at least one frequency band;

determining new spectral peak information of the at least one frequency band, the step of determining new spectral peak information comprising determining a new filter coefficient from the old filter coefficient and at least one additional term; and

augmenting a new feature vector with the new spectral peak information to create another augmented feature vector.

23. A system for determining spectral peak information in pattern recognition, the system comprising:

a memory that stores computer-readable code; and

a processor operatively coupled to the memory, the processor configured to implement the computer-readable code, the computer-readable code configured to:

determine pattern data;

split the pattern data into at least one frequency band;

determine spectral peak information of the at least one frequency band; and

augment a feature vector with the spectral peak information to create an augmented feature vector.

24. The system of claim 23, wherein the computer-readable code, when determining spectral peak information of the at least one frequency band, is further configured to determine a spectral peak frequency at which a spectral peak occurs in the at least one frequency band.

25. The system of claim 24, wherein the computer-readable code, when determining spectral peak information of the at least one frequency band, is further configured to determine a power of a bandpass signal centered at the spectral peak frequency.

26. An article of manufacture comprising:

a computer readable medium having computer readable code means embodied thereon, the computer-readable program code means comprising:

a step to determine pattern data;

a step to split the pattern data into at least one frequency band;

a step to determine spectral peak information of the at least one frequency band; and

a step to augment a feature vector with the spectral peak information to create an augmented feature vector.

27. The article of manufacture of claim 26, wherein the computer-readable program code means, when determining spectral peak information of the at least one frequency band, further comprises a step to determine a spectral peak frequency at which a spectral peak occurs in the at least one frequency band.

28. The article of manufacture of claim 27, wherein the computer-readable program code means, when determining spectral peak information of the at least one frequency band, further comprises the step to determine a power of a bandpass signal centered at the spectral peak frequency.

29. A system for determining spectral peak information in pattern recognition, the system comprising:

at least one band pass filter coupled to and receiving pattern data, each of the band pass filters outputting a different band pass frequency range; and

at least one adaptive Infinite Impulse Response (IIR) filter, each of the adaptive IIR filters coupled to a band pass frequency range of one of the band pass filters, each of the adaptive IIR filters determining spectral peak information for its corresponding band pass frequency range.

30. The system of claim 29, further comprising an augmenting device that augments a feature vector with the spectral peak information from each of the adaptive IIR filters to create an augmented feature vector.

31. The system of claim 29, wherein the pattern data comprises speech data.

32. A method for determining incremental information in pattern recognition, the method comprising the steps of:

determining a current feature vector;

determining a class;

determining current mutual information between the current feature vector and the class;

determining an augmented feature vector;

determining augmented mutual information between augmented feature vector and the class; and

determining the incremental information added by the augmented feature vector.

33. The method of claim 32, wherein the step of determining the incremental information comprises the step of determining the incremental information by subtracting the current mutual information from the augmented feature information.

34. The method of claim 32, wherein:

determining current mutual information between the current feature vector and the class further comprises the step of vector quantizing the current feature vector into a predetermined number of codewords; and

the step of determining augmented mutual information further comprises the step of vector quantizing the augmented feature vector into an augmented number of codewords, wherein the augmented number of codewords is equivalent to the predetermining number.

35. A system for determining incremental information in pattern recognition, the system comprising:

a memory that stores computer-readable code; and

a processor operatively coupled to the memory, the processor configured to implement the computer-readable code, the computer-readable code configured to:

determine a current feature vector;

determine a class;

determine current mutual information between the current feature vector and the class;

determine an augmented feature vector;

determine augmented mutual information between augmented feature vector and the class; and

determine the incremental information added by the augmented feature vector.

36. An article of manufacture comprising:

a computer readable medium having computer readable code means embodied thereon, the computer readable program code means comprising:

a step to determine a current feature vector;

a step to determine a class;

a step to determine current mutual information between the current feature vector and the class;

a step to determine an augmented feature vector;

a step to determine augmented mutual information between augmented feature vector and the class; and

a step to determine the incremental information added by the augmented feature vector.